

WHAT IS CLAIMED IS:

1. A method for processing a video signal , comprising:
 receiving (405) a series of image frames (F_n);
 decomposing (410) each frame into multiple bands;
 filtering (415) each image frame to produce an extended reference frame (210) corresponding to each image frame (202,204,206,208), the extended reference frames together comprising a group of frames, the group of frames being arranged in a circularly-referential structure; and
 partitioning (430) each band of each extended reference frame (210) into multiple range blocks and domain blocks A_j^i , each range block being predicted by a domain block of the circularly previous extended reference frame in the group of frames.
2. The method of claim 1, wherein the filtering is a complete-to-overcomplete interpolation filter.
3. The method of claim 1, wherein each domain block (A) is larger than the corresponding range block (B).
4. The method of claim 1, wherein each domain block (A) is at least four times larger than the corresponding range block (B).
5. The method of claim 1, wherein the process is repeated.
6. The method of claim 1, wherein each extended reference frame (210) includes phase-shifted coefficients of the corresponding image frame (204,206,208).
7. The method of claim 1, further comprising applying MC-DCT coding to a subset of subbands, of the multiple bands, of the wavelet decomposition to allow the backward compatibility to a conventional video coding standard.

8. The method of claim 1, wherein a part of sub-bands of the multiple bands are used to satisfy different sets of display sizes.

9. The method of claim 1, wherein the iteration number is determined by a decoder to satisfy the complexity constraint of the decoder.

10. A video processing system comprising a video decoding controller, the controller operable to receive (405) a series of image frames(F_n), decompose (410) each frame into multiple bands; filter (415) each image frame to produce an extended reference frame (210) corresponding to each image frame (202,204,206,208), the extended reference frames together comprising a group of frames, the group of frames being arranged in a circularly-referential structure, and partition (430) each band of each extended reference frame (210) into multiple range blocks and domain blocks A_i^j , each range block being predicted by a domain block of the circularly previous extended reference frame in the group of frames.

11. The video processing system of claim 10, wherein the filtering is a complete-to-overcomplete interpolation filter.

12. The video processing system of claim 10, wherein each domain block block (A) is larger than the corresponding range block (B).

13. The video processing system of claim 10, wherein each domain block block (A) is four times larger than the corresponding range block (B).

14. The video processing system of claim 10, wherein the controller performs the functions iteratively.

15. The video processing system of claim 10, wherein each extended reference frame (210) includes phase-shifted coefficients of the corresponding image frame (204,206,208).

16. The video processing system of claim 10, wherein the controller is further operable to apply MC-DCT coding to a subset of subbands, of the multiple bands, of the wavelet decomposition to allow the backward compatibility to a conventional video coding standard.
17. The video processing system of claim 10, wherein a part of sub-bands of the multiple bands are used to satisfy different sets of display sizes.
18. The video processing system of claim 10, wherein the iteration number is determined by the controller to satisfy a complexity constraint of the controller.
19. A computer program product tangibly embodied in a computer-readable medium, comprising:
 - instructions for receiving (405) a series of image frames (F_n);
 - instructions for decomposing (410) each frame into multiple bands;
 - instructions for filtering (415) each image frame to produce an extended reference frame (210) corresponding to each image frame (202,204,206,208), the extended reference frames together comprising a group of frames, the group of frames being arranged in a circularly-referential structure; and
 - instructions for partitioning (430) each band of each extended reference frame (210) into multiple range blocks and domain blocks A_j^i , each range block being predicted by a domain block of the circularly previous extended reference frame in the group of frames.
20. The computer program product of claim 19, wherein the filtering is a complete-to-overcomplete interpolation filter.
21. The computer program product of claim 19, wherein each domain block (A) is larger than the corresponding range block (B).
22. The computer program product of claim 19, wherein each domain block (A) is four times larger than the corresponding range block (B).

23. The computer program product of claim 19, wherein the process is repeated.

24. The computer program product of claim 19, wherein each extended reference frame (210) includes phase-shifted coefficients of the corresponding image frame (204,206,208).

25. The computer program product of claim 19, further comprising instructions for applying MC-DCT coding to a subset of subbands, of the multiple bands, of the wavelet decomposition to allow the backward compatibility to a conventional video coding standard.

26. The computer program product of claim 19, wherein a part of subbands of the multiple bands are used to satisfy different sets of display sizes.

27. The computer program product of claim 19, wherein the iteration number is determined by a decoder to satisfy the complexity constraint of the decoder.